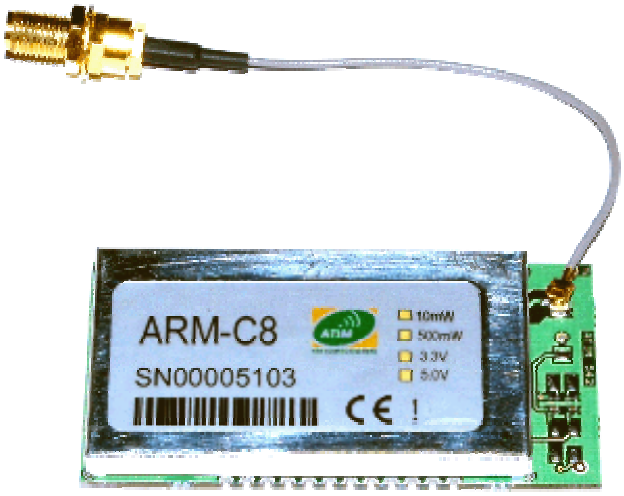
ARM-C8 Transceiver

Advanced Radio Modem ®



User Manual

Summary

1 PRESENTATION 4
1.1 INTRODUCTION 4
1.2 GENERALITIES 4
1.3 AVAILABLE VERSIONS 4
1.4 OPERATING PRINCIPLE 4
2 TECHNICAL SPECIFICATIONS 5
3 ARM-C8 CIRCUIT BOARD DESCRIPTION 6
3.1 UPPER VIEW OF ARM-C8 RADIO MODEM 6
3.2 ARM-C8 RADIO MODEM PAD SLOTS 6
3.3 MOTHER CB INTEGRATION RECOMMENDATIONS 7
4 OPERATING MODES 7
4.1 IDENTIFICATION 7
4.2 TRANSPARENT MODE 7
4.3 SECURIZED MODE 8
4.4 FREQUENCY CHANGING 10
4.5 RADIO MODEM CONFIGURATION 10
4.6 CONFIGURATION USING HAYES COMMANDS (AT) 10
5 TEST MODE 11
6 INSTALLATION 12
6.1 RADIO CHANNEL SELECTION BY P0, P1 AND P2 SIGNALS 12
6.2 CHANNEL SELECTION 13
7 APPENDIX A - HAYES AT COMMANDS 14

EC-DECLARATION OF CONFORMITY

CE !

Manufacturer's name: **ATIM SARL**
Responsible person : RAIMBERT Francis, Manager
Manufacturer's address : Les guillets – 38250 Villard de lans - France

declares that the product:

Product name: ARM Radio Modems Range (Advanced Radio Modem)
Model number: ARM-C8 (433MHz/10mW, 868MHz/500mW versions)
Intended use: Data Transmissions.

complies with essential requirements of article 3 of R&TT 1999/5/EC Directive, if used for its intended use and that the following standard has been applied:

1 **SAFETY** (Article 3.1a of the 1999/5/EC Directive)
Applied standard(s) NF EN60950 Ed. 2000
(health) Recommendation 519 (July 1999)

2 **Electromagnetic compatibility** (Article 3.1b of the 1999/5/EC Directive)
Applied standard(s) EN 301 489-3 v1.4.1

3 **Efficient use of the radio frequency spectrum** (Art.3.2 of the 1999/5/EC Directive)
Applied standard(s) ETSI EN300 220-3 v1.1.1

Villard de lans, June 15th 2005

Francis RAIMBERT, Manager.

1 PRESENTATION

This guide contains main information for a quick setup of the ARM-C8 radio transceiver. For more details, it is recommended to refer to the ARM Manual.
ATIM keeps the right to modify the features of the product and the information of the User Manual without any notice. For technical support, contact our distributors or resellers.

1.1 INTRODUCTION

With more than 10 years of experience in radio communication technologies and field interventions, we have designed this ARM product range, a new generation of radio modem. We have integrated inside all our know-how and the digest of various requirements from different users. For that reason, the ARM (Advanced Radio Modem) range, as indicated in its name, is very versatile and is available in a multitude of versions.

1.2 GENERALITIES

The purpose of a radio modem is to replace a wired link by establishing a High Frequency communication between 2 or several remote points.
The ARM radio modem fits with a large demand in this area by offering a cost-effective and high performance solution. It is an open system with many extension and configuration possibilities as well as a large selection of frequency band.

The ARM product can be used for remote control, supervision, telemetry, data transfer, etc., everywhere where cabling is sensitive and expensive (dams, remote weather stations, ski runs, …), as well as for mobile applications (vehicles, conveyors, travelling cranes, cranes, robotics, etc.).

1.3 AVAILABLE VERSIONS

- ARM-D « **D**igital » radio modem, 2 digital inputs and outputs
- ARM-DA « **D**igital + **A**nalog » radio modem, idem + 1 analog (4-20mA) input and output
- ARM-S « **S**erial » radio modem, RS232/485 + 1 digital input and output
- ARM-E « **E**thernet » radio modem (RJ45 connector) + 1 digital input and output
- ARM-C « **C**ompact » radio transceiver O.E.M.
- ARM-X…. « E**x**tensions » modules (Digital, Analog, …)

1.4 OPERATING PRINCIPLE

Very easy to use, the ARM-C8 is entirely configurable using a simple terminal with Hayes commands. User can setup the operating mode for its application: transparent or securized.

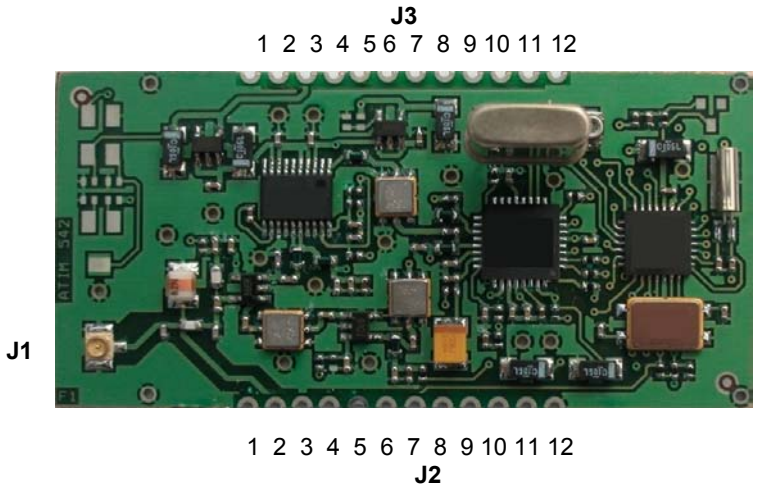
The transparent mode is the default mode which requires not any setting. This mode is suitable for most cases where a protocol is managed by the client device (For instance PLCs communicating in Modbus protocol).

2 TECHNICAL SPECIFICATIONS

Radio	Direct FSK modulation Excursion : +/-9.6kHz Throughput : 19,200 bps by default (1,200 to 76,800 bps on request) Sensivity in reception : -105 dBm @9600 bps Number of channels : 16 - Selection of 8 channels by pad combination - Selection of 16 channels by software Maximum transmission time of one byte between 2 modems at 19,200 bps : 5 ms Latency : < 3.5 ms **Radio – Version 868MHz** 868MHz ISM band (see channel table) Space : 50kHz EIRP: 10 / 500mW (according to version)
Interfaces	12-pad slot (2.54mm = 10TH pitch) including: - Power supply - Antenna - Asynchronous mode serial link with flow control (RTS,CTS) - 3 input ports for radio channel selection 12-pad slot (2.54mm = 10TH pitch) including: - 3.3VDC power output - 1 Input port for test mode selection **All input and output signals must be at 3-3.3V level**
Power supply	Voltage : 5VDC +-.5% Consumption : • ~ 30mA in reception • ~ 150mA in transmission at 25mW • ~ 500mA in transmission at 500mW Output voltage on b3 of J3 Voltage min : 3.05v ; max 3.25v Available max. intensity : 20mA
Connectors	• 2x12-pad slots (2.54mm = 10TH pitch) • 1 U.FL type antenna connector
Dimensions	• 64*32*4mm (L*W*T)
Environnement	• Operating temperature: -20 / +50°C • Storage temperature: -40 / +70°C
Miscellaneous	• Compatibility with ARM modules

3 ARM-C8 CIRCUIT BOARD DESCRIPTION

3.1 UPPER VIEW OF ARM-C8 RADIO MODEM



3.2 ARM-C8 RADIO MODEM PAD SLOTS

Description of pad slot **J2**

N°	Signal	Type of I/O	Description
1	GND		Ground
2	ANT		Antenna
3	GND	-	Ground
4	+5V		Power supply
5	CTS	Input	Clear to Send
6	RTS	Output	Request to Send
7	RxD	Input	Data reception
8	TxD	Output	Data transmission
9	P0	Input	Radio channel selection
10	P1	Input	Radio channel selection
11	P2	Input	Radio channel selection
12	GND		Ground

Description of pad slot **J3**

N°	Signal	Type of I/O	Description
1	GND		Ground
2			Do not cable
3	3.3V	Output	3.00-3.25V (max 20mA) power output
4	P3	Input	Test mode (Put pull up)

5			Do not cable
6			Do not cable
7			Do not cable
8			Do not cable
9			Do not cable
10			Do not cable
11			Do not cable
12			Do not cable

3.3 MOTHER CB INTEGRATION RECOMMENDATIONS

The ARM-C8 module must be absolutely powered in 5V +/-5%.
All the input and output signals must be at 3-3.3V level.
The P0, P1, P2, P3 input signals don't have internal « pull-up », then external « pull-up » (value 100K) must be put and connected either to the 3.3V of the J3 pad slot or to the 3V or 3.3V supplied by the mother CB. Caution! If the P3 signal is at the 0V level or not connected to a pull-up, the modem can switch into the test mode.
Likewise, the serial link signals must be at the 3-3.3V level. To convert the signals from 5V to 3V, it is possible to use the components from the 74LVC family. Reversely to adapt signals from 3V to 5V, it is possible to use the components from the HCT family.
The RxD signal has an internal "pull-up" on the board.

The ARM-C8 can be soldered on the edge or in flat position on a circuit board.

4 OPERATING MODES

4.1 IDENTIFICATION

Each ARM radio modem has a unique identification address defined in factory (16-bit with expansion possibility).

4.2 TRANSPARENT MODE

In this mode, only the handling of the physical layer of the data is realized: each incoming byte of the transmitter module is copied into the receiver module. No error protocol is managed. It is possible to establish a point-to-point or multi-point link. A communication protocol must be enabled on the devices connected to the radio modem (for instance: PLCs with Modbus, Unitelway protocol or else).
Note : in this mode, radio transmission is not a 100% reliable media, therefore the data could be corrupted from time to time and must be repeated as necessary.

Format of radio frame:
- Sync bits (N bit synchronization)
- Message (x bytes)

[Header] **[Data]** **[End Sequence]**
3.3ms 8b x n x 52µs 6b x 52µs

(n: number of bytes of incoming frame)

The radio modem will switch in transmission when receiving the first incoming byte of the serial link (+ eventual delay timer ***« Nr of Bytes before tx » (register S17)*** corresponding to the transmission time of these n bytes at the baud rate of the serial link: for instance 1 ms for 2 bytes at 19200bps). This timer is reset to zero at every reception of a byte on the serial link. In fact, there must be a silent time corresponding to the transmission time of these "n bytes" before starting the transmission.

The transmission goes on as long as the reception buffer of the serial link is not empty. At the end of transmission of the last byte of the buffer, a timer starts to maintain in transmission mode during the time of n bocks of 312µs corresponding to n packets of 6 stop-bit. This time is adjustable by the value of **« Nr of stop frames after Tx » (register S18).** This timer is set for every new frame's transmission. This value must be identical for all connected ARM in the same application.

The ARM has a 250 bytes buffer. If the baud rate of the serial link is equal to the radio one, then the data are sent directly. If this baud rate is lower than the radio one, then the utilization of the timer after their transmissions avoids the swapping of the modem in reception mode and time loss (switching time Tx>>Rx>>Tx).
If this baud rate is lower than the modem one, the data are sent directly while the incoming bytes are stored progressively in the 250-byte buffer of the modem. If the buffer is full, then the modem can't take anymore into account the incoming data of the serial link which are lost. In this case, CTS and RTS flow control signals must be used imperatively, the last one is activated when the number of bytes in the reception buffer reaches 240.

Repeater option
In transparent mode, the operation of the repeater is simple: it memorizes only incoming frame (max. 250 bytes) and retransmits it once at the end of its reception.
- Repeater mode with data forwarding on serial link option (Bit 5 of register S00)
- Repeater mode without data forwarding on serial link option (Bit 4 of register S00)

With Hayes commands, registers to be configured in transparent mode: S00, S17, S18.

4.3 SECURIZED MODE

In securized mode, the radio modem manages the communication as well as the communication errors. A master modem can manage several slaves.

Format of radio frame:

[@Local] [@Destination] [@Repeater] [Control] [Length] [Data] [CRC16]

@Local : local address (16 bits)
@Destination : destination address (16 bits)
@Repeater : repeater address (16 bits) (optional according to flags S00, bits 4 and 5)
Control : control byte (Nr. of repetition, repeater mode, etc.)

Length : length of the incoming data from 1 to 250 (8 bits)
Data : incoming data from serial link for transmission
CRC16 : 16-bit frame control algorithm

In this mode, 3 features are available:

1 – Point-to-point communication
Just define the local address and the destination address for every modem (respectively registers S08 and S09).

2 – Dialing mode communication « ATD »:
Then the radio modem behaves as a standard telephone modem. By default, it is in command mode and expects an « ATDxx » command, where xx represents the destination address (in ASCII from 1 to 99).

Example of connection :

ATD02 'The modem @01 calls the remote modem @02

RING '(serial port of modem @02)
CONNECT '(serial port of modem @01 and @02)

[Connected mode ….Bidirectional securized communication….]

Automatic disconnection after security time-out (S52,S53) and return in command mode.

Call modem @02 with repeater: **ATD03,02** 'The modem @03 is the repeater

Attention: the DCD (Data Carrier Detect) and DTR (Data Terminal Ready) signals are not managed. It is possible to have an alternative solution by using the digital input IN (DTR) and the digital output OUT (DCD) of the ARM (active if connected).

3- Securized mode with external addressing communication
In this case, user must include in the head of his message, 2 bytes corresponding to the address of destination (16 bits). This method allows to address to old devices which are not addressable normally (for instance ASCII scrolling displays).

With Hayes commands, registers to configure in securized mode: S05, S06, S17, S22, S45, S21, S46, S47.

Important remarks:
It is possible to use the RTS/CTS flow control (same as in transparent mode, see previous paragraph).
Every modem can be a repeater, the radio frame can be repeated only once by only one repeater modem.
The configuration must be identical for all the modems used in a same application, except the addresses.
In a configuration with repeater, the register S22 (Nr. of retransmission) must be 0 and the value of the register 21 (ACK frame waiting time) must be doubled.

4.4 FREQUENCY CHANGING

It is possible to use the frequency changing function while the modem is operating. So, the user must switch into configuration mode and execute the specific Hayes command:
AT&Cxx=nm
- xx allows to change the frequency according to 2 modes. The first (xx=00) changes directly the frequency without proceeding to the calibration of the radio. The frequency changing is done within 1ms.
The second (xx=01) changes directly the frequency by proceeding to the calibration of the radio. The frequency changing is done in around 100ms.
The calibration enables an internal reconfiguration of the radio circuit. It is recommended to realize this calibration either on reception default or on a time-out.
- nm value: n represents the transmission channel and m the reception channel.
As soon as the frequency changing is realized, the program returns automatically in the operating mode defined by the user (Transparent or securized mode).

Steps of the sequence for the frequency changing on the radio channel 3 :
« Reception modem on serial link » : +++
« Transmission modem on serial link » : ARM-C8 VERSION 1.1
>
« Reception modem on serial link » : AT&C00=33

4.5 RADIO MODEM CONFIGURATION

The radio modem has a configuration by default in the firmware (Eeprom), which can be modified according to the requirement of the application. This modification can be done, either in factory, either by using Hayes commands via the RS232 port.
On reset, the system controls the presence of valid data in Eeprom which will be loaded as standard configuration. If not, the default configuration on the Eeprom will be loaded instead.

4.6 CONFIGURATION USING HAYES COMMANDS (AT)

The AT frame must be sent to the ARM with the programmed UART format (by default: 19,200bps, 8 bits, no parity, 1 or 2 stop bits).

→ If you don't remind the last recorded format, it is possible to return to the configuration by default of the UART by going into the test mode #12 (see test mode here below).

See table of AT's registers ---------- > Appendix A

Example :

+++	'Go into command mode		
ATS12	'Read S12 (Baudrate)	*S12=04*	(Reply : 19200bps)
ATS12=03	'Write S12= 03 (9600bps)	S12=03	(Reply : 9600bps)
AT&W	'Save parameters in Eeprom		
ATR	'Reset modem		

5 TEST MODE

The test mode can be activated either by Hayes commands or by activating the pins b9, b10, b11 on the J2 connector.

Test 1	Inputs and outputs control Connect input b10 of J2 on output b6 of J3 Connect input b11 of J2 on output b11 of J3 Connect input b4 of J3 on output b5 of J3 Connect input b6 of J2 on output b5 of J2 1kHz signal on output b9 of J2
Test 2	Read Eeprom configuration and send to RS232
Test 3	Transmit carrier
Test 4	Transmission of numbered frames of 250 ASCII characters every 200ms
Test 5	Reception of data on RS232
Test 6	Read RSSI and send value on RS232 Bit2 register S49 = value 16 channels (bit=0) Bit2 register S49 = value 1 channel (register3) (bit=1)
Test 7	Master PING PONG Transmission of 250 characters and waiting in reception for 250 characters Send on the RS232, the number of received characters Since Version 4.0: If reception of 250 good characters: Rx led ON (Green) If reception of only 1 to 249 good char. : Rx Led + Sys Led ON If reception 0 good char. : Sys led ON (Red) If no reception: Rx and Sys leds OFF
Test 8	Slave PING PONG Waiting in reception for 250 characters then transmission of 250 characters Send on the RS232, the number of received characters
Test 9	Do not use
Test 10	Do not use
Test 11	Do not use
Test 12	Serial link parameters reconfiguration: 19200/8/N/1 forced transparent mode
Test 13	Eeprom reprogramming with default values

Pins configuration: 0 = connection to 0V 1 = connection to +Vdc

Test mode	B9 J2	B10 J2	B11 J2
No test (standard mode)	0	0	0
Test 1 : Inputs / Outputs test	1	0	0
Test 2 : Eeprom test	0	1	0
Test 3 : Carrier Tx Test	1	1	0
Test 7 : Master PING PONG	0	0	1
Test 8 : Slave PING PONG	1	0	1
Test 12 : Serial Link reconfiguration	0	1	1
Test 13 : Eeprom factory reconfiguration	1	1	1

6 INSTALLATION

Before setting the product, please read the following recommendations:

- The power supply must be +5V +/-5%
- All the inputs-outputs are 3V-3.3V (min-max)
- Before connecting or disconnecting the antenna, make sure to discharge to the ground, static electricity as the antenna input is very sensible.

6.1 RADIO CHANNEL SELECTION BY P0, P1 AND P2 SIGNALS

The radio channel selection can be realized normally by the selection of a combination of the P0, P1, P2 inputs (also possible by « Hayes » commands – see paragraph 4.4), which is read only when switching on. The power must be cut off before selecting the radio channel and switch on after.

The configuration of the modem must comply with the standard and so it must respect a duty cycle. The transmission power is not the same according to the selected channel, see above:

The 5mW and 25mW transmission power of are governed by software. The power is defined in factory in a given configuration. According to the integration and the type of antenna, this power may varied. For that reason, it is possible to reduce this power by modifying the value of the register S04:

S04=09 //max power value 7dBm (5mW)

Adjustement : S04=08

S04=0F //max power value 14dBm (25mW)

Adjustement S04 between 0A and 0F

S04=C0 //optimized value for channels D, E and F (250mW)

Selection by P0, P1 and P2 input ports

Channel	Frequency (MHz)	Selection by Px	Level P2 – P1 – P0	
0	869.800	No	-	Max. ERP : 25mW Duty cycle : 1%
1	868.075	Yes	0 - 0 - 0	
2	868.125	No	-	
3	868.175	Yes	0 - 0 - 1	
4	868.225	No	-	Max. ERP : 5mW Duty cycle : 100%
5	868.275	Yes	0 - 1 - 0	Max. ERP : 500mW Duty cycle : 10%
6	868.325	No	-	
7	868.375	Yes	0 - 1 - 1	
8	868.425	No	-	

9	868.475	Yes	1 - 0 - 0
A	868.525	No	-
B	869.850	Yes	1 - 0 - 1
C	869.900	No	-
D	869.475	Yes	1 - 1 - 0
E	869.525	No	-
F	869.575	Yes	1 - 1 - 1

6.2 CHANNEL SELECTION

The configuration of the radio modem must respect the standard and therefore, the parameters must also comply to the duty cycle. The ERP is different depending on the selected channel as shown here below:

Channel	Frequency (MHz)
0	869.800
1	868.075
2	868.125
3	868.175
4	868.225
5	868.275
6	868.325
7	868.375

Channel	Frequency (MHz)
8	868.425
9	868.475
A	868.525
B	869.850
C	869.900
D	869.475
E	869.525
F	869.575

Max. ERP : 25mW Duty cycle : 1%
Max. ERP : 5mW Duty cycle : 100%
Max. ERP : 500mW Duty cycle : 10%

For enabling communication between ARM's modules of an application, a same channel number must be set on all the concerned modules.

Note: in the case another radio modem, not belonging to the same application, is placed next to those of the main application, make sure to leave at least a free channel between the 2 channels of the 2 applications : application 1-Channel #2 and application 2-Channel#4, for example.

7 APPENDIX A - HAYES AT COMMANDS

Commands	Functions
AT	Mandatoty prefix for all Hayes commands
O	Switch to communication mode (transparent)
&W	Write registers in Eeprom (Proceed only when its content has been modified)
&F	Restore default parameters and reset the Eeprom
In	n=0 Boot version n=1 Firmware version n=2 Card ID Address n=3 Country code + Application code
+++	Return to Hayes mode
ATR	Reset
ATDxx	Dial Mode (securized mode) Call distant modem xx (1 – 99)
&T0	Exit Test mode
&Tx	Test functions (x= 1 to 12)
Sxx ?	Read register x and return hexadecimal value (? optional)
Sxx=nn	Write nn (value in hexadecimal) in register xx

NOTES: All Hayes command lines must be terminated by « CR » (Carriage Return)

The Hayes command frame must be sent to the ARM under programmed UART format (by default: 19.200bps, 8 bits, no parity, 1 or 2 stop bits).

If you don't remember the last registered format, it is possible to come back to the default UART configuration by using the test mode "12" (cf. Test mode).

Nr	Utilization of register
S00	Application Register1 : see details
S01	Application Register2 : see details
S02	Tx Channel (transmission): $00 à $0F
S03	Rx Channel (reception): $00 à $0F
S04	Tx Power Selection (default $FF)
S05	Securized Mode : Destination Address LSB
S06	Securized Mode : Destination Address MSB
S07	Local Address 8 bits (Securized mode)
S08	N.U.
S09	N.U.
S10	Repeater Address LSB
S11	Repeater Address LSB
S12	RS232 Baud Rate $00=1200 ; $01=2400 ; $02=4800 ; $03=9600 $04=19200 ; $05=38400 ; $06=76800 ; $07=115200
S13	RS232 Data Bit : $07 ou $08
S14	RS232 Parity : bit0 : = 0 parity disabled ; = 1 parity enabled bit1 : = 0 odd parity ; = 1 even parity
S15	RS232 Stop Bit = 1

S16	RS232 Flow Control bit0 : = 0 no flow control ; = 1 CTS/RTS bit6 (manual interface selection) : = 0 RS232 ; =1 RS485 bit7 : = 1 enable automatic serial interface detection
S17	Time before Radio Tx : Number of required silence bytes at the end of the incoming frame (for switching in radio transmission mode).
S18	End Tx wait: Number of required silence bytes after the last radio transmitted byte (for switching in radio reception mode).
S19	N.U.
S20	N.U.
S21	Securized Mode : Wait time ACK (time base: 1ms)
S22	Securized Mode: Number of Tx (radio) repetitions if error.
S23	N.U.
S24	N.U.
S25	N.U.
S26	N.U.
S27	N.U.
S28	N.U.
S29	N.U.
S30	Application Register 5 : See details (F/W V3.5 ->)
S31	Reception wait time (tb :1ms)
S32	RSSI value (Receive Signal Strength Indicator)
S33	Do not change !
S34	Application Register 3: see details
S35	Application Register 4: see details
S36	Radio reception timeout (tb:1ms)
S37	Do not change !
S38	Do not change !
S39	Do not change !
S40	Application Register 6 see details
S41	Preamble code
S42	N.U.
S43	N.U.
S44	N.U.
S45	Securized Mode: Number of bytes in buffer
S46	Securized Mode : ACK ASCII Code (sended to RS232)
S47	Securized Mode : NACK ASCII Code (sended to RS232)
S48	Do not change !
S49	Do not change !
S50	Do not change !
S51	Do not change !
S52	Watchdog: Time out if no radio reception LSB (tb :1s)
S53	Watchdog: Time out if no radio reception MSB (tb :1s)
S54	N.U.
S55	N.U.
S56	N.U.
S57	N.U.
S58	Tx preamble
S59	Rx preamble
S60	N.U.

S61	N.U.
S62	N.U.
S63	N.U.
S64	N.U.
S65	N.U.
S66	N.U.
S67	N.U.
S68	N.U.
S69	N.U.
S70	N.U.
S71	N.U.
S72	N.U.
S73	N.U.
S74	N.U.
S75	N.U.
S76	N.U.
S77	N.U.
S78	N.U.
S79	N.U.
S80	N.U.
S81	N.U.

Application Register 1 :

b0-b3: 0 Transparent Mode
1 Securized Mode
b4 : Repeater Mode
b5 : Repeater Mode with messages on the serial port
b6 : N.U.
b7 : Securized Mode: Enable ACK NACK on the serial port

Application Register 2 :

Non Used

Application Register 3 :

b0: Do not modify !
b1: Securized Mode: External addressing Mode (2 first bytes)
b2: N.U.
b3: Enable Watchdog Alarm (Mirror and Modbus modes)
b4: Frequency selection: pins (0) or AT register (1)
b5: N.U.
b6: Enable Eeprom reinitialisation if Alarm Watchdog
b7: N.U.

Application Register 4 :

b0-b6: N.U.
b7: Radio: enable preamble register

Application Register 5 :

b0: Securized Mode: Select Local Address using Register S07 (default)
b1: Securized Mode: Select “Dial” mode (Securized Mode)
b2: Securized Mode: Enable Timeout for “Dial” Mode
b3-b6: N.U.
b7 : Enable reset if 2 * time-out (v3.8)

Application Register 6 :

b0: Radio: Enable RSSI function
b1: Radio: Enable code in preamble
b2: Radio: -2dB attenuation
b3: Radio: Enable 24bits radio header
b4: N.U.
b5: N.U.
b6: N.U.
b7: N.U.

Attention :
All modification of configuration parameters (in AT mode) will result modification of current program. If the incoherent data are stored, dysfunction may occur.